Please amend Claim 7 as follows:

7. (Once amended) The chip scale structure of Claim [5]6 further comprising a solder ball formed on each metallized pad on the glass sheet.

Please cancel Claims 8 – 14.

REMARKS

Claims 1 – 14 are pending in the application. Claims 8 – 14 were subject to a restriction requirement and have been canceled by Applicant. Applicant has canceled Claims 1 – 3 and has substituted new Claim 15 therefor, Applicant has canceled Claim 5 and has substituted new Claim 17 therefor, Applicant has amended Claims 4, 6, and 7, and Applicant has added new Claim 16. Claims 15, 4, 16, 17, 6, and 7 remain in the Application. Applicant requests reconsideration and re-examination of the application as amended.

The Examiner rejected Claim 1-7 under 35 U.S.C. §103(a) as being unpatentable over Lin (U.S. Patent No. 5,258,648) in view of Tsukamoto (U.S. Patent No. 5,705,858) and Igarashi et al. (U.S. Patent No. 5,814,894). The Examiner stated:

> Lin shows a flip chip device see figure 5 and column 5, line 15) with a semiconductor chip 12 attached to an interposer 22. Lin shows the interposer board attached to a PC board with layer of adhesive 36 but does not show a similar attachment between 12 and 22, noting that while it is standard practice (column 2, line 22) it prevents rework. Note that if rework is not an issue, bonding is recommended. Lin also teaches that the thermal coefficient of expansion of the interposer should match that of the die (column 6, line 28). Lin shows vias 24 in the plate 22 with evaporated traces 26 (column 6, line 64) on the plate which connects contacts 16 to vias 24 and solder beads 32 are formed on the surface of 22. Lin shos that the metallization 26 can be evaporated and if performed after forming the hole it will extend into the holes. In addition a conductive fill is used for the vias (column 6, line 66). Lin does not specify the material of the plate 2 but Tsukamoto shows a similar structure where the plate is a ceramic which will match the TCE of the die. Igarashi et al. Show the use of polyimide to bond the die tot he intermediate sheet.

The Examiner concludes:

> It would have been obvious to modify the device of Lin to include the glass ceramic plate taught by Tsukamoto to match the TCE of the die and plate and to use the polyimide bond taught by Igarashi et al. to have a known bonding material.

This rejection is overcome because the structure of the present invention is not disclosed.

by the Examiner, Lin shows the interposer board attached to a PC board with a layer of adhesive 36. The patent to Lin teaches that there is an air layer between the semiconductor die and the interposer plate. In contrast the present invention shows a glass structure 200 attached to a semiconductor wafer 210 by a layer of adhesive 212. In addition, the present invention recites:

A chip scale structure comprising:
a semiconductor wafer with a pattern of bond pads on a surface of the semiconductor wafer, wherein the bond pads can be formed anywhere on the surface of the semiconductor wafer;
a glass sheet with holes in a pattern matching the pattern of bond pads on the surface of the semiconductor wafer;
a layer of adhesive adhering the glass sheet to the semiconductor wafer, wherein the holes in the glass sheet are over the bond pads on the surface of the semiconductor wafer;
metallized pads formed on the glass sheet adjacent to each hole in the glass sheet; and
a conductive trace connecting each of the metallized pads to a corresponding bond pad on the surface of the semiconductor wafer.

The present invention teaches a glass sheet having metallized pads formed adjacent to each hole in the glass sheet and solder beads or bumps are then formed on the metallized pads. The glass sheet has a pattern of holes that are aligned with each of the metal pads on the underlying semiconductor wafer. The cited references taken individually or in any combination do not disclose, suggest or teach this feature.

The references taken individually or in any combination do not disclose, teach, or suggest the combination of the present invention as a whole. Applicant respectfully submits that the rejection under 35 U.S.C. §103(a) is overcome because the Examiner has not identified a basis for the conclusion that "it would have been obvious to modify the device of Lin to include the glass ceramic plate taught by Tsukamoto to match the TCE of the die and plate and to use the polyimide bond taught by Igarashi et al. to have a known bonding material." The opinion of the Examiner as to what would have been obvious at the time the invention was made is irrelevant and meaningless. The Examiner must have some basis for the conclusion other than a mere opinion. The Examiner's obviousness rejection based upon the combination of references is improper because the Examiner has not pointed out where in the references there is a reason, suggestion or motivation in the prior art whereby a person of ordinary skill in the field of the invention would make the combination. In fact, the cited prior art teaches away from the combination as disclosed and claimed in the present application. In addition, the references, taken in any combination, do not show the combination as

disclosed and claimed by the present invention. Therefore, it is impossible for the Examiner to conclude that it would have been obvious to combine the references.

The PTO has the burden under §103 to establish a *prima facie* case of obviousness. In re Piasecki, 745 F.2d 1468 (Fed. Cir. 1984). The *prima facie* case of obviousness can only be satisfied by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references. In re Fine, 837 F.2d 1071.

Obviousness is tested by "what the combined teachings of the references would have suggested to those of ordinary skill in the art." In re Keller, 642 F.2d 413. But it "cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion supporting the combination. [emphasis added] ACS Hosp. Sys. [Inc. v Monefiore Hosp., 732 F.2d 1572. And the "teachings of references can be combined *only* if there is some suggestion or incentive to do so." Id.

Because none of the references cited by the Examiner disclose the combination disclosed and claimed by the present invention, the Examiner, as discussed above, must point out where in the cited prior art, there is a suggestion to make the combination. The Federal Circuit, in In re Paulsen, 30 F.3d 1475 (1974) stated that "we have been guided by the well-suited principles that the claimed invention must be considered as a whole, multiple cited prior art references must suggest the desirability of being combined, and the references must be viewed without the benefit of hindsight afforded by the disclosure." In addition, the Federal Circuit, in Texas Instruments Inc. v. U.S. Int'l Trade Comm'n, 988 F.2d 1165 stated "Absent such suggestion to combine the references, respondents can do no more than piece the invention together using the patented invention as a template. Such hindsight reasoning is impermissible.

The present invention discloses and claims a glass plate with holes that correspond 1-to-1 with metal pads on a semiconductor device to which the glass plate is adhered, the glass plate has metal pads adjacent to each hole and solder bumps are formed on the metal pads on the glass plate. None of the cited references disclose, teach, or suggest this combination. The Examiner has concluded, without any basis in fact, that "It would have been obvious to modify the device of Lin to include the glass ceramic plate taught by Tsukamoto to match the TCE of the die and plate and to use the polyimide bond taught by Igarashi et al. to have a known bonding material." The Federal Circuit,

in In re Gordon, 733 F.2d 900 stated that in regards to a reference being modified "The mere fact that the prior art could be so modified would not have made the modification obvious unless the prior art suggested the desirability of the modification."

In view of the clear guidelines provided by the Federal Circuit, Applicant believes that the present application, as amended, is patentable over the references cited by the Examiner and requests and early allowance.

Respectfully submitted,

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I certify that this document is being deposited on 2/22/99 with the U.S. Postal Service as first class mail under 37 C.F.R. §1.8 addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231

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Signature

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Typed or printed name